American Druggist
AN ILLUSTRATED TRADE JOURNAL

VOL. XX. NO. 22. NEW YORK, NOVEMBER 16TH, 1891. WHOLE NO. 220.

AMBERGRIS.

THE exceedingly high prices (equal to fully three times the weight, in gold, of the drug) which perfumers have been compelled to pay for the finest ambergris lately is the best proof of the indispensability of the drug in the preparation of high-class perfumes. For over a year the price of the best ambergris has now ranged from 180*s.* to 200*s.* per ounce,* and until quite lately there did not seem to be any prospect of an early fall in prices. The small compass within which a very valuable quantity of the drug may be imported without attracting attention, and the ease with which the requirements of the custom regulations, that all goods imported shall be entered under their proper name and at their full value, may be circumvented where it is deemed advisable to keep quiet concerning a consignment of ambergris, render it exceedingly difficult to follow closely the imports of the drug. It is stated, for instance, that, although for many months fine ambergris has been thought to be exceedingly scarce in the English market—and the visible supply has been so in reality—there has been a far greater supply available than has appeared on the surface. Under these circumstances the recent importation of a piece of ambergris from Melbourne, weighing, it is said, 136 pounds and valued at £10,000, naturally caused a good deal of excitement. The piece is believed to be the same which was captured by a black man in Tasmania some time ago. But the matter still remains shrouded in some mystery, for the London consignees of the parcel refuse to show the piece to any one, and even decline to give the slightest information of any value. Whether this policy is a wise one or not is an arguable question; it is certain, however, that the mysteriousness of the consignees has not assisted in allaying the fears of a heavy fall in the price of the drug that were the natural outcome of the announcement of the large importation. It may be presumed, however, that the consignees will want to dispose of the drug, and it is certain that they will not be able to do so without showing their hand.

The historiological references to ambergris have recently been enriched by the publication, under the auspices of the Hakluyt Society, of the account of the voyages of François Leguat, a French Huguenot, to the isles of Rodriguez and Mauritius, Java and the Cape of Good Hope. The Sieur Leguat's voyages were made during the years 1691 and 1698, and in his narrative frequent references are found to the precious perfume. He states that it occurs plentifully on the shores of Mauritius, as well as of the island now known as Réunion, in the Indian Ocean, due east of Madagascar, and also on those of the little island of Rodriguez, in the same latitude, where, to quote his words, "the sea brings up yellow amber and ambergreece." The word "amber-gris" (gray amber) was, in fact, given to the substance expressly to distinguish it from the ordinary or yellow amber. Possibly both were believed to be of common or allied origin. Ambergris has been a prized and costly luxury for centuries, though the Sieur Leguat does not appear to have been quite alive to the value of the drug until taught by bitter experience. At Rodriguez he found a large piece of the substance, and carried it along as a curiosity, not knowing the true importance of the find. That piece of ambergris wrought its discoverer cruel misfortunes. It weighed about 6 pounds, and, as Leguat's party no longer cared to carry it, they disposed of it for a trifle to a Dutch artisan of the island, which was then a Dutch colony. The colonists were stringently forbidden to own or trade in the commodity, which was a monopoly of the Dutch Trading Company, who forwarded to Batavia all the ambergris found on its outlying stations, and from that port shipped the drug to Holland for sale. When the governor of Rodriguez learnt that Leguat's party had traded in the substance, he seized all their belongings, and finally banished them to a barren island rock, where they suffered great hardships. In the "London Price Current of Colonial Produce" of 1707 ambergris is quoted at 40*s.* to 45*s.* per ounce troy for "gray fine," while Irish amber, obtained on the Atlantic coast of the Emerald Isle, was valued at 25*s.* per ounce. Considering the respective purchasing powers of money two centuries ago and at the present day, these prices are quite equal to the average value of ambergris in recent years.

So plentiful was ambergris on the shores of the islands in the Indian Ocean in the seventeenth and eighteenth centuries that some of the islets of the northeast coast of Mauritius became known as the "Isles d'Ambre." Ambergris was also found in the Japanese waters; and the Dutch traders not only kept Europe supplied with it from their emporium in Batavia, but also imported it into the dominions of the various Eastern potentates with whom they came in contact. A piece almost rivalling the latest giant find was imported from Batavia into Madras in 1699, and is described in contemporary chronicles as "a very stately piece of ambergris, upwards of 800 ounces." On the Madras Islands, again, west of Ceylon, ambergris, according to another seventeenth-century traveller, was more plentiful than in any other part of the Indies. Any of it found on shore had to be delivered up to the king, the penalty for failing to comply with this order being the cutting off of the culprit's hand.

In the writings of earlier travellers references to ambergris are also by no means infrequent. Zanzibar was famous for its ambergris from before the time of Marco Polo. But there is no need to hark back to the

* Tincture of Ambergris (4 oz. to the gallon) is quoted in wholesale price-lists at $1.25 per pound, that is, $20 per gallon.—ED. AM. DRUGG.

half-forgotten worthies who made history in the Indies centuries ago for accounts of gigantic pieces of the valuable drug. It is true that the largest single piece recorded in history as an authentic find (it weighed 182 pounds) was one purchased from the king of Tydore by the Dutch East India Company nearly two centuries ago, but from America stories have since come of pieces many times heavier than that of the king of Tydore. It is only fair to say, however, that these American stories have never been backed by trustworthy evidence. Hence the account of the find, in the year 1853, by the schooner *Watchman* of Nantucket, of 640 pounds of ambergris in a whale floating on the high seas [see also *Amer. Journ. Pharm.*, where one whale is reported as having yielded 750 pounds of it.—ED. AM. DR.], with the stories of a 560-pound piece brought home by an American whaler in 1886, of a 266-pound trophy captured by a New Bedford whaler, and of a 130-pound piece taken out of a whale near the Windward Islands, may be dismissed as "not proven"; and the mass of detail with which some of these accounts are embellished may fairly be regarded as having been added simply "to lend artistic verisimilitude to a bold and unconvincing narrative," as Mr. Gilbert has it.

It is a fact, however, that in 1882 a piece of ambergris weighing 12 pounds, and found in a grave pit in New Zealand, was sold in the London market. It realized an average price of 65 shillings per ounce. There is also a story current that a well known Mincing Lane broker was instructed some years ago to sell "a barrelful" of ambergris which had been for many years in the unappreciated possession of a gentleman who was altogether unaware of the nature of the substance of which he was the fortunate owner. The barrel proved to be ambergris of very fair commercial quality, and was disposed of, with careful management, at the full market value of the day, the broker wisely never hinting to any one, until the last piece was sold, how great was the quantity entrusted to his care, for fear of spoiling the market.

The greater part of the ambergris sold in London during the last few years has been obtained by the New Zealand and Tasmanian whalers who ply their trade in the Antarctic Ocean. Whale-fishing was once an important industry in Tasmania, and quite a large fleet of whalers was owned by Hobart firms. Now the Tasmanian industry has practically ceased to exist, and there is no hope of its revival. New Zealand still possesses fisheries of some importance, and will probably continue to supply our market with much of its ambergris for many years to come. Meanwhile spermaceti whales are getting scarcer year by year, and the time may soon come when the scarcity of ambergris shall be chronic instead of spasmodic. It is to be hoped that, before that date, science will have taught us how to supplant nature in the production of ambergris; but at present there are no indications whatever of an efficient synthetic substitute.—After *Chem. and Drugg* (Editorial, October 17th).

Wild and Cultivated Herbs.—At the recent meeting of the German Scientific Congress Dr. Schweissinger, of Dresden, read a paper dealing with the examination of a few narcotic herbs, showing the effect upon their alkaloidal value. The results obtained, so far as henbane is concerned, practically corroborate Mr. Gerrard's work. They are as follows:

	Per cent alkaloid
Herb. aconiti, wild	0.58
" " cultivated	0.60
" belladonnæ, wild	0.40
" " cultivated	0.17
" hyoscyami, wild	0.085
" " cultivated	0.070
" stramonii, wild	0.32
" " cultivated	0.26

Dr. Schweissinger extracted the herbs with water acidulated with sulphuric acid, evaporated, removed pectin by filtration, then added ammonia, and extracted the alkaloid with ether-chloroform, checking the result by titration. In the course of the discussion it was stated that wild stramonium is preferred in Germany, and Mr. Dieterich mentioned that cultivated belladonna and henbane yield not only very good extracts, but extracts which are rich in alkaloid.—*Chem. and Drugg.*

Assaying Pharmaceutical Preparations.

MR. F. A. THOMPSON, of Detroit, presented, at the meeting of the Michigan Pharmaceutical Association in October, valuable suggestions respecting details of assaying adapted to galenicals, from which we quote:

A feature of his methods, for which he claims originality, is the use of *oak* sawdust for the tannin which it contains, which, as used, serves to retain coloring, waxy, and extractive matters and a considerable amount of chlorophyll. Other varieties of sawdust fail to accomplish this purpose.

BELLADONNA, STRAMONIUM, CINCHONAS, AND HENBANE.

		Requirement, based on average strength of drug.	Amount for Assay.
Fluid Ext.	Belladonna Leaves	0.40% total alkaloids.	10 C.c.
" "	" Root, U. S. P.	0.50% " "	10 C.c.
" "	Stramonium Leaves	0.35% " "	10 C.c.
" "	" Seeds, U. S. P.	0.35% " "	10 C.c.
" "	Cinchona Calisaya, U. S. P.	2% quinine.	2 C.c.
" "	" Red, not less than	4% total alkaloids.	2 C.c.
" "	" Pale, " " "	3% " "	2 C.c.
" "	Henbane, U. S. P.	0.10% " "	25 C.c.

REAGENTS.

Oak Sawdust, No. 30 powder	5 to 7 Gm.
Modified Prollius' Mixture*	100 C.c.
Dilute Sulphuric Acid, 1 to 5	q. s.
Chloroform (1 vol.) and Ether (4 vol.) mix	q. s.
Ammonia Water	q. s.

Directions.—Gradually add the respective fluid extract (cinchona is best diluted 1 in 5 with 50-per-cent alcohol) to 5 or 7 Gm. of the sawdust, contained in a shallow dish, and, after thoroughly mixing, expose in a warm (100° to 110° F.) place for half to one hour. Transfer the dry mixture to an elongated 4-ounce bottle, and add 100 C.c. modified Prollius' mixture. After macerating fifteen to twenty minutes, with frequent shaking, transfer 50 C.c. of the clear supernatant liquid to a suitable beaker, add 5 C.c. of water and enough dilute sulphuric acid to render aqueous fluid distinctly acid, after thoroughly mixing with ethereal solution, and evaporate spontaneously or at a low temperature, removing the adhering alcohol by digesting a few minutes on a steam, sand, or water bath. Redissolve all the chlorophyll, wax, etc., in ether, and transfer the two fluids to a 2-ounce prescription bottle having a good lip, rinsing the beaker with sufficient acid water and ether to remove all the contents to the bottle. Wash the acid solution with ether until free from chlorophyll and coloring matter, rejecting the same, then add enough ammonia water to render fluid distinctly alkaline, and extract the alkaloids with the ether-chloroform mixture, using three portions, of 15, 10, and 10 C.c. each respectively. The addition of 5 C.c. of ether here facilitates the complete separation of the ethereal fluid. Evaporate the combined ether-chloroform solution to dryness at a low temperature, or spontaneously in a tared capsule, and dry the alkaloidal residue at 175° to 180° F. to a constant weight. The alkaloids so obtained should be completely soluble in dilute sulphuric acid. In the case of cinchona calisaya, the percentage of quinine can be estimated by the present U. S. P. method, or still better, by De Vrij's precipitation, as an iodo-sulphate.

Remarks.—The above process may be carried out satisfactorily by one of the following modifications: 1. Instead of evaporating the ethereal solution, it can be placed in a separator, and the alkaloids extracted out with a small quantity of acid water, using 3, 2, 2, and 2 C.c. respectively, and this solution treated the same as the acid solution in the above process. 2. The alkaloids may be extracted with larger quantities of acid water, using about 20 C.c. in four portions of 5 C.c. each, transferring the same to a separator, adding an alkali, and extracting the alkaloids with chloroform, using three portions of 10 C.c. each, and evaporating the same to dryness, and

*Ether 250 C.c.
Chloroform 90 C.c.
Alcohol 25 C.c.
Ammonia, conc. 10 C.c.

drying residue to constant weight. By the latter method particles insoluble in acid water are sometimes carried along with the chloroform, unless great care is exercised and time allowed for the chloroform solution to entirely separate. In practice I prefer the original method.

COLCHICUM SEED AND ROOT.

	Requirement.	Amount for Assay.
Fl. Ext. Colchicum Seed, U. S. P.	0.50 Colchicine, by trituration.	10 C.c.
" " " Root "	0.50 " " "	10 C.c.

REAGENTS.

Same as used for above process.

Directions.—Proceed the same as with the above process till the alkaloids are obtained in an acid solution, and instead of extracting, dilute the solution to 15 C.c. with 3-per-cent sulphuric acid and titrate with N-20 Mayer's reagent.

*Rule for Calculating Results.**—Subtract from cubic centimeter N-20 Mayer's reagent used, for each cubic centimeter of fluid after titration, 0.08 C.c., and multiply the remainder by 0.29 for percentage. If less than 3 C.c. N-20 Mayer's reagent is required, dilute only to 10 C.c.

COCA LEAVES.

	Requirement.	Amount for Assay.
Fl. Ext. Coca Leaves, U. S. P.,	0.50 Ether Sol. Alkaloids.	10 C.c.

REAGENTS.

Oak Sawdust, No. 30 powder	5 to 7 Gm.
Benzin	95 C.c.
Alcohol (9 vol.) and Ammonia (1 vol. con.) mix	5 C.c.
Dilute Sulphuric Acid, 20 per cent	q. s.
Ether	q. s.
Ammonia	q. s.

Directions.—Obtain the dry mixture of sawdust and fluid extract the same as by above process, and, after transferring to suitable bottle, add the benzin and ammoniated alcohol, and macerate for an hour with frequent shaking. Decant 50 C.c. of the supernatant liquid to a suitable separator, add about 2 C.c. of water and sufficient dilute sulphuric acid to render aqueous fluid distinctly acid after a thorough rotation of the two fluids. Draw off the acid fluid, after complete separation, into a 2-ounce bottle having a good lip, repeat washing benzin solution with small portions (2 C.c.) of slightly acid water, using not over 10 C.c. in all. Wash the acid fluid with ether till free from chlorophyll and any other coloring matter, render fluid alkaline with ammonia water, and extract alkaloid with ether, evaporating the combined ethereal washings in a tared capsule. Dry alkaloidal residue to a constant weight at 175° to 180° F. Alkaloids should be completely soluble in dilute acid water.

CONIUM SEED.

	Requirement.	Amount for Assay.
Fl. Ext. Conium Seed	0.50 Coniine.	10 C.c.

REAGENTS.

Oak Sawdust, No. 30 powder	5 to 7 Gm.
Benzin	q. s.
Alcohol (9 vol.) and Ammonia (con. 1 vol.) mix	5 C.c.
Dilute Hydrochloric Acid, 1 per cent	q. s.
Hydrochloric Acid, U. S. P.	q. s.
Potassium Carbonate	q. s.

Directions.—Proceed the same as with coca preparations up to the step of extracting the alkaloids from benzin solution, there substituting hydrochloric for sulphuric acid, using the 1-per-cent acid after the first washings. Wash the acid solution with ether, reject, add about 20 C.c. benzin and sufficient potassium carbonate to precipitate the alkaloids, and shake vigorously. Decant the benzin solution into a 2-ounce vial containing 5 C.c. of 1-per-cent hydrochloric acid. After complete separation return to the original bottle, and repeat the washings two or three times, or until the alkaloid is completely transferred to the acid solution—which should be clear, otherwise filter—to a tared capsule by the aid of alcohol, and evaporate at a low temperature, hastening the volatilization of the last traces of uncombined hydrochloric acid by adding at intervals 1 or 2 C.c. of alcohol. Dry at about 90 C. to a constant weight, and weigh as muriate. Multiply the result by 0.77675 to obtain the amount of coniine.

* Lyon's Manual of Assaying, p. 78.

RECAPITULATION OF RESULTS OBTAINED BY LYON'S, LLOYD'S, AND AUTHOR'S PROCESSES.

Preparation.	Lyon's (Manual of Assaying).	Lloyd's.*	Author's.
Fl. Ext. Belladonna leaves.	0.44 per cent.	0.40 per cent (re-extracted.)	0.45 per cent 0.47 "
Fl. Ext. Belladonna root.	0.44 "	0.39 per cent (re-extracted.)	0.46 "
Fl. Ext. Stramonium seed.	0.36 "	0.30 per cent (re-extracted.)	0.34 "
Fl. Ext. Stramonium leaves	0.34 "	0.27 per cent (re-extracted.)	0.34 "
Fl. Ext. Cinch. Comp.	1.47 " (lime process.)	....	1.52 "
Fl. Ext. Conium seed	0.40 per cent.	.....	0.38 "
Fl. Ext. Colchicum root.	0.36 "	.....	0.38 "
Fl. Ext. Coca leaves	0.53 " 0.50 "	.....	0.51 "
Fl. Ext. Henbane.	0.09 " †	.....	0.092 " 0.088 "
S. Ext. Stramonium leaves	2.7 "	.....	2.9 "
S. Ext. Belladonna leaves.	4.6 "	.....	4.9 "
Cocaine (muriate) in 50 per cent alcohol.	Amount taken. (1) 0.50 Gm. (2) 0.50 " (3) 0 50 "	....	Found. (1) 0.0485 Gm. (2) 0.0495 " (3) 0.049 "
Atropine (sulphate) in 50 per cent alcohol.	Amount taken. (1) 0.0392 Gm. (2) 0.0191 " (3) 0.0191 " (4) 0.0392 "	....	Found. (1) 0.038 Gm. (2) 0.020 " (3) 0.0185 " (4) 0.038 "
Hyoscyamine in 50 per cent alcohol.	Amount taken. 0.020 Gm.	.....	Found. 0.0185 Gm.

Note on Oil of Neroli.

SCHIMMEL & Co. announce (in their "Herbst-Bericht") that oil of neroli of their own distillation has a specific gravity of 0.887 and is optically inactive. When cooled to +15° C. (59° F.), a solid in form of fine, shining lamellæ begins to separate from it. At 0° C. (32° F.) the oil solidifies to a mass having the consistence of butter. The stearopten of oil of neroli appears to be a paraffin-like substance, similar to that existing in oil of rose. It may be separated from the liquid portion of the oil by means of 90-per-cent alcohol, in which it is difficultly soluble.

Schimmel & Co. examined eleven different samples of oil of neroli, obtained from the best commercial sources, and found their specific gravities to vary, at 15° C., between 0.875 and 0.889. Among nine of these samples, eight were found to polarize to the right, and only one was found optically inactive. The rate of polarization varied from +0°52′ to +9°40′. Only one of them solidified at 0° C. All the others remained liquid. None of them separated any stearopten upon addition of 90-per-cent alcohol.

For the present no explanation of these differences in behavior can be given. It may be due to natural causes, but is likely to be followed up until the matter is cleared up.

* Using 75 C.c. instead of 50 C.c. chloroform for 5 C.c. of fluid extract.
† Modification of Beckurts' process. Pharm. Rund., Oct., 1891, p. 240.

India Opium.

THE public interest in the cultivation of the poppy and the manufacture of opium in India has lately been somewhat excited owing to endeavors made through the English Parliament to get the Indian Government's connection with it abolished. Whether opium smoking in China would thereby be diminished, and whether it is an evil which should be suppressed, are matters which do not come within our province, nor shall we discuss them. But the agitation against the opium trade during the last parliamentary session has done a good service to science by securing the official publication of an article on opium by Dr. George Watt, C.I.E., reporter on economic products with the Government of India. The article was written for the "Dictionary of Economic Products of India," and consists of about seventy-five foolscap pages of print. It deals fully with the habitat of the poppy, the trade in poppy seed and the manufacture of oil therefrom. The average yearly export of poppy seed from India during the past ten years has been about 600,000 cwt., Bombay and Bengal providing two-thirds of it, and Belgium and France receiving the same proportion of the exports. The native consumption of the seed and the oil is large. Extensive as the exports are, imports are recorded regularly from year to year, part of the imported seed coming from Persia, this seed being the supply from which, after propagation, much of the Malva opium is obtained.

As to the history of opium we need not follow Dr. Watt closely. The Arabs carried it to India somewhere about the eighth century. At the same time, or probably a century before, the poppy was taken to China, and it appears certain that the poppy has been grown there for the extraction of opium since the fifteenth century. The story of its progress as a luxury amongst the Celestials is too long for these columns. Edict after edict against it has been issued. It was regarded as an evil before England had put foot in India. Yet the habit has grown, and that to such an extent that India, Arabia, Egypt, and Persia have been unable to keep pace with the demand for the drug. Ten years ago the opium produced by the Chinese themselves amounted to about 30,000,000 pounds per annum, or three times as much as is obtained from all other sources. The present exports of opium from India amount to about 13,300,000 pounds per annum, a little more than two-thirds going to China.

Opium is also manufactured in India for local consumption, but not so largely as for export. In Bengal it is grown under a license from the Government. The cultivators have advances made to them; they sell their product to the Government at a price fixed for the year. The opium is finally sold by auction at Calcutta to the highest bidder, and at that point the direct connection of the Government with it ceases. The Malva opium, grown in Central India and Rajpootana, yields a revenue to the state, chiefly from the duty charged for its transit through British territory to Bombay. In 1889–90 the total net Indian revenue from opium was Rs. 7,908,322.

While there is no doubt that the poppy which grows in Asia Minor, and from which medicinal opium is obtained, is the *Papaver somniferum* var. *glabrum*, we possess no proof, Dr. Watt says, as to whether or not that plant grows in India. One of the most interesting parts of his report deals with the botany of the poppy, and he has occasion to lament that so many authorities and writers (even the authors of "Pharmacographia Indica") have perpetuated mistakes and repeated statements without personal investigation. That the Bengal poppy and the Malva are different has generally been the idea, the former being said to be *P. somniferum* var. *album*, and the latter var. *glabrum*, so Dr. Dymock and his associates say; but Dr. Watt states, in effect, that although the Malva poppy has a red-like flower, it has many characteristics which exclude the supposition that it is *glabrum*. Considering all the experiments made by Mr. Scott, a man with great practical experience if not precise botanical knowledge, Dr. Watt is able to select at least fourteen forms which are probably recognizable races. There is the white-capsuled poppy, the black-stalked poppy, monaria, teyleah, kutila, sabzakutila, and so on, each of which can easily be recognized by the experienced eye; each differing in value, especially in yield and quantity of opium, and some which grow well in Malva have proved ill-suited to the climate and soil of the opium tract in Behar and Benares. The poppy is not a wanderer in India. Although it has been cultivated for centuries, few of the plants are to be found growing wild. Mr. Scott's observations were made upon plants experimentally grown by himself and compared with plants from the fields. Every care was taken to keep each distinct, and it is, therefore, of much value, as a commentary upon the recent suggestion to employ Indian opium in British medicine, to notice the morphia yield of the inspissated juices from the respective poppies. It is notable that in all cases the alkaloid value is very much lower than that of Asia Minor opium. These are the figures in percentages:

Narcotine.	Morphine.	Total.
3.4	2.98	6.38
3.31	2.88	6.19
3.14	3.16	6.30
3.65	3.56	7.21
3.71	3.71	7.42

These results are taken from opium which has not undergone any cooking, so that destruction of morphia is excluded. But that is of little moment in view of the relative proportions of narcotine and morphine in the opium. Narcotine, it will be seen, is the chief constituent; it is the objectionable principle of opium, and exists in Asia Minor opium to the extent of scarcely more than a fourth of the morphine present. It is obvious, therefore, that, apart from the low morphine content of Indian opium, its high percentage of narcotine quite unsuits it for medical use. The question arises, Can the varieties of poppy at present grown in India be made, by different methods of culture, to yield an opium of equal value to that from Turkey? The question cannot be satisfactorily answered until the true *Papaver somniferum* var. *glabrum* has been cultivated in India; but it seems unlikely that this plant could degenerate in that country to the condition of the plants which have so long been propagated there. It is not a matter of culture at all, but one of botanical variety, and Dr. Watt is right in asking that greater attention should be paid to this branch of the subject. His whole report, several sections of which we have not ventured to touch, is one which should throw considerable light upon a somewhat obscure subject.—After *Chem. and Drugg.*, October 24th.

A New Formation of Calomel.

ETTORE BARBI, of Siena (Italy), announces in *Bolletino Farmaceutico* (1891, 547) that he has observed a new reaction by which calomel is generated.

He had occasion to pass the gas produced in the preparation of chloride or sulphate of zinc—viz., hydrogen—into a concentrated aqueous solution of mercuric chloride, when he noticed that this became cloudy at first and afterwards deposited a white precipitate, which was found to be calomel. Upon cooling the solution of the bichloride the precipitate became more copious. The reaction is evidently a simple reduction by hydrogen, and must take place after the following scheme:

$2HgCl_2$ mercuric chloride	+	H_2 hydrogen	=	Hg_2Cl_2 calomel	+	$2HCl$ hydrochloric acid

Borax-Boric Acid.

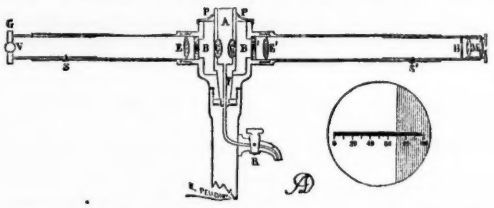
THE somewhat feeble solubility of boric acid in water (1 in 25) has induced Mr. Jaenicke, of Goerlitz, to search for a substance which would increase its solubility without interfering with its uses. He found borax to be the most suitable. Equal parts of borax and boric acid can be made to crystallize together in form of hard crystals, which are soluble in about 6.5 parts of water at the ordinary indoor temperature, in about 3.3 parts at 100° F., and in about 1.3 parts at boiling. If a hot saturated solution is rapidly cooled, it will separate the excess of the salt, not immediately, but after some time only; hence it is possible to use supersaturated solutions in certain cases.—*Therap. Monatsch.*, No. 9, 477.

OPTICAL DETERMINATION OF ALBUMIN IN URINE.

We have already in our preceding volume described Jean's Oleorefractometer, by means of which the identity and purity of many fixed oils, fats, and other bodies readily reduced to a liquid state may be determined.

H. O. C. Ellinger has recently found that it may also be employed for the estimation of albumin in urine.

The apparatus, which is here illustrated, consists of a tube, having a telescope at one end, and a lens at the other which is placed in front of the source of light. In the centre of the instrument is a reservoir confined between the glass plate B and B', and within this reservoir is a removable prism with glass sides. If both the reservoir and the prism are filled with the same liquid, the observer looking through the telescope will find, upon a photographically reduced scale contained inside of the tube, a shadow, the perpendicular line of which coincides with the mark 0. If the two liquids differ optically, the shadow will begin at a different mark. In some cases it will be to the left, in others to the right of zero. According as the



case may be, there is an arrangement by which the observation may be easily made in either case. In the cut the scale shown is that used for substances having a right-handed action.

Ellinger has found that if urine containing albumin is deprived of the latter by heating, addition of a drop of dilute acetic acid, and filtration, a portion of the filtrate then introduced into the central reservoir of the instrument, and some of the unboiled but filtered urine introduced into the prisms, the shadow will be pushed to the right in proportion to the amount of albumin. In five different experiments the author obtained the following readings on the scale:

2.5, 4, 4.5, 5, 5.

By actual analysis the corresponding amounts of albumin in 1,000 parts of the urine were found to be—

2.71, 4.36, 4.94, 5.10, 5.22.

It will be seen, therefore, that the results are sufficiently accurate for clinical purposes.—After *Journ. f. prakt. Chem.*, 44, 256.

Cleaning of Cover Glasses.

The following two methods are recommended in the *Pharm. Zeitung* for the cleaning of cover glasses for microscopic objectives:

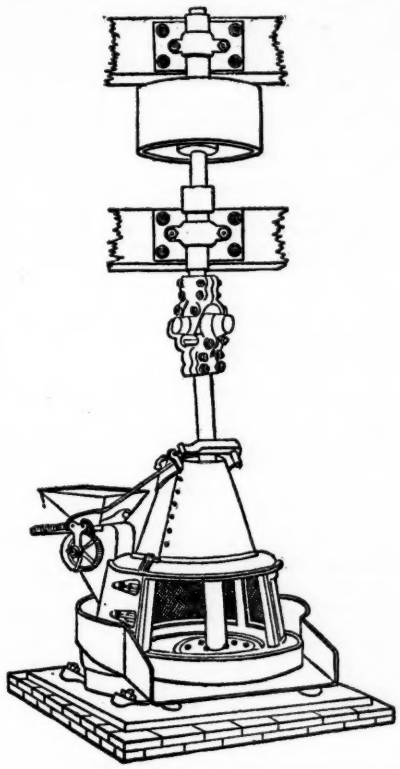
1. Dissolve a pinch of chromic acid in about 1 drachm of water in a wide, flat-bottomed glass vessel, add 2 fluidounces of sulphuric acid, and place the cover glasses, each separately, into the liquid. After an hour pour off the liquid, wash the glasses several times with water, and then cover them with a mixture of 1 volume of hydrochloric acid and 3 volumes of alcohol. Pour this liquid off after about fifteen minutes, wash the glasses several times with alcohol, and lastly with perfectly pure ether, dried by means of calcium chloride. Lastly, the glasses are placed on a sheet of smooth white paper spread out by means of a small glass rod, and as soon as dry (after about five minutes) transferred into a box. (J. Lusteck.)

2. Place the cover glasses, immediately after use, into concentrated sulphuric acid. When a sufficient quantity has been collected together, add some more of the acid, and warm for some time. Then pour off the acid, wash well with water, next with absolute alcohol, and lastly with ether.

A NEW DRUG MILL.

The accompanying cut represents a new grinding mill which possesses several novel features.

Its motive power is intended to be an engine, attachment being made by a belt. The axle carrying the pulley and grinding plate is loosely bolted to solid supports, and the axle is doubly jointed, permitting the lower half, to which the grinding plate is attached, to assume vari-



ous angles of inclination, corresponding to the varying thicknesses of fragments which are passed between the grinding surfaces from the hopper attached to the side. This hopper is kept in vibratory motion by the revolution of the axle, thus insuring a regular feeding of new material. The pressure is exerted merely by the weight of the grinding plate, axle, and pulley.

A New Use for Tuberculin.

The Board of Health in Philadelphia has, according to the New York *Times*, begun an inquiry concerning the sale of the milk of consumptive cows in that city. It appears that this action was suggested by the report of the investigation made by a committee which was instructed, by the Veterinary Department of the University of Pennsylvania, to test the value of Koch's tuberculin by experiments in which cows should be the subjects. The committee began its work last spring, and its conclusions are that, while the tuberculin has no value as a curative agent, it is very useful as an agent for revealing the presence of tuberculous disease. It is difficult to detect tuberculosis in cows in the early stages of the malady, and as it is of great importance that the actual condition of diseased milch cows should be known, the tuberculin may possibly be of great service to the human race, even if the condition of consumptives cannot be improved by the direct application of it. The committee was led by the result of its experiments to publish a most emphatic warning against the sale of the milk and flesh of tuberculous animals, and this has directed the attention of the Board of Health to the milk supply.—*Medical Record.*

Method of Preparing Small Quantities of Solutions of a Definite Specific Gravity.

MR. CARL MUELLER read a paper on this subject at a recent meeting of the Pharmaceutische Gesellschaft at Berlin (*Berichte der Pharm. Ges.*, i., 247).

The object of the author was to facilitate the preparation of such solutions when more refined apparatus, such as specific-gravity balances, etc., were not available.

The only requisites are a good scale and a graduated cylinder or a flask marked at 10, 20, 25, 50, or 100 C.c.; also a thermometer.

The method employed by the author is one of calculation chiefly, a denser liquid having to be diluted with a lighter liquid, which in most cases will be water.

The author's method is not new; but, as it is always useful to refer to such formulæ, we give it here.

Let the following denote:

W = weight in grammes of the stronger solution.
V = volume in cubic centimeters of the stronger solution.
S = specific gravity of the stronger solution.
s = specific gravity of the solution which is to be prepared.
x = volume in cubic centimeters or grammes of water to be added.

[All volume is understood to be in cubic centimeters, and all weights in grammes. It should also be remembered that

(*a*) Volume (in cubic centimeters) × spec. grav. = weight (in grammes).

(*b*) $\frac{\text{Weight (in grammes)}}{\text{Spec. grav.}}$ = Vol. (in cubic centimeters).

(*c*) $\frac{\text{Weight (in grammes)}}{\text{Vol. (in cubic centimeters)}}$ = Spec. grav.]

The absolute weight of the more dilute solution may be expressed in two different ways,

either

$$V \times S + x \text{ (where x denotes grammes of water)},$$

or

$$(V + x)s \text{ (where x denotes cubic centimeters of water)}.$$

Setting these values equal, we have

$$VS + x = (V + x)s,$$

and, solving this equation for x, we get

$$x = V\frac{S-s}{s-1} \qquad \text{(No. 1)}$$

x here denotes the number of cubic centimeters of water which are to be added to V cubic centimeters of the stronger solution to produce the solution of the desired lower specific gravity.

This may also be expressed thus: The V cubic centimeters of the stronger solution are to be diluted with water until the total weight is equal to W + x (the original weight of the stronger solution), and the quantity of water, in grammes, found by the above-given formula.

As the water need not be weighed, but may be measured (in cubic centimeters), weighing becomes altogether unnecessary under certain circumstances. This is the case always when the specific gravity (S) of the stronger solution is actually given and does not require to be determined experimentally.

If it is desired to start from the absolute weight (W) of the stronger solution, instead of its absolute volume (V), then it will be easily seen that the following equation expresses this:

$$x = \frac{W}{3} \cdot \frac{S-s}{s-1} \qquad \text{(No. 2)}.$$

Hence, if the specific gravity of both the stronger and the weaker solution is given, no determination of volume is required at all.

If very great accuracy is required, the temperature, rate of contraction, etc., must be taken account of.

Example.—Supposing we have a solution of potassa of specific gravity 1.135, and we are to prepare from it one of specific gravity 1.050, then we find from equation No. 1 that we have to add, say to 100 C.c. of the strong solution,

$$x = \frac{100\,(1.135-1.050)}{1.050-1} = \frac{8.5}{0.05} = 170 \text{ C.c. of water.}$$

Or to 10 C.c. we have to add 17 C.c., or to 1 C.c. 1.7 C.c. of water, etc.

On the other hand, it may be required that a *definite* volume (V) of a more dilute solution be prepared by mixing a stronger solution with water.

Let

y = the number of cubic centimeters of the stronger solution.

The value of V will therefore be expressed by

$$y + x = V \qquad \text{(No. 3)}$$

Hence the absolute weights will be expressed by the following equation, in which the term x remains unchanged, as 1 C.c. of water is considered to be equal to 1 Gm.:

$$Sy + x = Vs \qquad \text{(No. 4)}$$

Solving both of these equations for y (or eliminating y), we obtain

$$x = V\frac{S-s}{S-1} \qquad \text{(No. 5)}$$

The value of V in this equation refers to the value of y.

On substituting, in equation No. 3, the value for x found in equation No. 5, we obtain finally

$$y = V\frac{s-1}{S-1} \qquad \text{(No. 6)}$$

The rule is therefore as follows: To $V\frac{s-1}{S-s}$ C.c. of the concentrated solution add $V\frac{S-s}{S-1}$ C.c. of water.

Example.—We have a solution of potassa of specific gravity 1.135. We want to prepare 100 C.c. of a solution of specific gravity 1.05.

We must therefore mix

Stronger Solution	+	Water
$V\frac{s-1}{S-1}$	+	$V\frac{S-s}{S-1}$
$100\frac{1.05-1}{1.135-1}$	+	$100\frac{1.135-1.05}{1.135-1}$
or		
37.04 C.c.		62.96 C.c.

[*Note by Ed. Am. Drugg.*—We have translated freely, and have omitted some portions. Of course, the same method of calculation may be used also when the diluent is not water but a dilute solution of the same substance.]

Pental, or Trimethyl-ethylene.

ANOTHER anæsthetic has made its appearance, viz., "pental." This is the name given by Dr. von Mering, of Halle—who had also introduced the hypnotic amylene hydrate, $(CH_3)_2COH$, into therapeutic practice—to a new derivative of amylene, viz., the trimethyl-ethylene: $(CH_3)_2.C:CH.CH_3$. It is to be regretted that a commercial name has been coined for this; or at least that no better name than "pental" has been chosen, for the presence of 5 carbon atoms should not have been taken as a characteristic feature. [We agree in this matter fully with the editor of the *Pharm. Zeitung*, from which we take the notice of this new anæsthetic.]

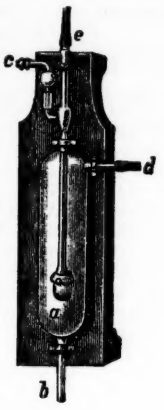
According to present reports, pental is a safe anæsthetic, and acts promptly, only about 20 C.c. of it being required to produce anæsthesia, which supervenes generally after four or five minutes. Insensibility is neither very deep nor very long, but it is sufficient to permit, under its influence, the performance of minor operations, such as extraction of teeth, etc. In most cases insensibility to pain appears before complete unconsciousness. Pental is said not to produce any disagreeable after-effects, and no untoward symptoms during its use.

Trimethyl-ethylene boils, according to E. Schmidt, at 35° C. (95° F.); according to Le Bel, at 36°–38° C. (96.8°–100.4° F.). Its spec. grav., according to R. Schiff, is 0.6783 at 0° C. (32° F.), and 0.6353 at 36.8° C. (98.3 F.).

AN IMPROVED FILTER PUMP.

MAX STUHL has constructed an improved filter pump, entirely of glass, which is here illustrated.

It works well even with a pressure of only one atmosphere, and uses less water than any filter pump heretofore constructed.



Suction takes place through the tube *c*. This is connected in the usual manner with the vessel from which the air is to be exhausted. When the apparatus is to be used for suction, that is, for rapid filtration, *d* is closed with a cap or by a rubber tube and pinchcock. Water is admitted at *e* and passed out through *a* and *b*.

The apparatus may also be used to produce a blast. In this case *d* is connected with the blowpipe, and the flow of water is carefully regulated so that the blast will have just the desired strength, without any permanent collection of water in the air chamber *a*.

It is capable of producing an evacuation to as low as 20 Mm.

The apparatus is manufactured, in one piece, and mounted on a board, by Max Stuhl, of Berlin.

Examination of Drugs in Massachusetts.

THE report of the inspection of drugs in Massachusetts during the year ending September 30th, 1890, just received, contains many items of general interest. In the course of the general report the following statements occur:

Within the past year there was a sudden increase in the number of empirical preparations used as cosmetics, and especially of certain articles advertised for the purpose of "improving or beautifying" the complexion. Upon examination of these preparations, several of them were found to be of an unusually poisonous character. They contained from 3 to 8 grains of bichloride of mercury (corrosive sublimate) to the fluidounce, the principal ingredients being corrosive sublimate, water, and a little tincture of benzoin. In the case of one of these articles—Madame Rupert's Face Bleach—it was further stated that "*it is guaranteed harmless, containing no arsenic, lead, bismuth, sulphur, lime, or anything injurious to the skin. Its effect is always beneficial.*" Another preparation—Madame Fale's Excelsior Complexion Bleach—put up in the same attractive form, is stated to be "*composed of strictly harmless ingredients*," but was found on analysis to be nearly identical with the former and containing the same violent poison. These articles were heralded by glowing advertisements, and in the case of the latter a public hall in Boston was secured, a band of music, and a free lecture given for the purpose of introducing the preparation to the public. To the credit of the people, it should be stated that the audience was very small.

Instances of serious harm from the use of these articles came to the knowledge of the board—a fact which is not surprising when it is known that deaths have occurred in several instances from the external use of strong solutions of corrosive sublimate. . . . If such preparations are used at all, they should only be sanctioned if accompanied by careful instructions, and with knowledge of their poisonous character on the part of the user. . . . The preparations already named were sold in violation of this act [quoted in the report]. No "written prescription of a physician" was called for; no "record of the sale" was made, and "the name and residence of the person to whom it was delivered" was not reported in either instance. The word "poison" was not placed upon the bottle, and the "name of the antidote" was also omitted. In view of these facts, complaints were made out against the agents who sold these two preparations in Boston, and at the trial, which took place in December, both were convicted and fined under the aforesaid statute. Two other preparations, bearing the names of Soule's Eradicator and Delisle's Royal Cream, were examined soon afterward, and found to contain corrosive sublimate in about the same proportion or strength. Parties selling these articles were also convicted and fined under the same act.

The report by Dr. Bennett F. Davenport upon the examination of drugs is sufficiently interesting to be quoted at length:

Of the 400 samples of drugs which were submitted to me for examination during the past twelve months, 75, or 18.75 per cent, were found not to be of their proper standard quality as called for by the laws of Massachusetts relating to food and drugs.

Among the drugs examined were 7 samples of powdered opium, which, assayed by the official method, yielded the following per cents of morphia:

Between	12.5	and	12.6	per cent of morphia,		1	sample.
"	12.4	"	12.5	"	"	1	"
"	12.3	"	12.4	"	"	1	"
"	12.0	"	12.1	"	"	1	"
"	11.6	"	11.7	"	"	1	"
"	11.3	"	11.8	"	"	1	"
"	10.7	"	10.8	"	"	1	"

Of tincture of opium the 30 samples examined by the above method of assay were found to yield:

Between	1.20	and	1.30	per cent of morphia,		7	samples.
"	1.10	"	1.20	"	"	10	"
"	1.00	"	1.10	"	"	3	"
"	0.90	"	1.00	"	"	5	"
"	0.80	"	0.90	"	"	5	"

The 1 sample of apomorphia, and the 2 samples of powder of opium and ipecac, which were examined, were all found to be of standard quality.

Of the 31 samples of simple salts of cinchona alkaloids, all were found to be of standard quality, while with the compound salts of citrate of iron and quinine the following yields were obtained upon assay of the scales:

Between	12	and	13	per cent of alkaloid,		15	samples
"	11	"	12	"	"	10	"
"	8	"	9	"	"	1	"

while the single sample of the salt in solution proved to contain but the one-eighth part of the proper quantity of the alkaloid, this year's experience in this respect thus being similar to preceding ones.

With the 11 samples of tincture of nux vomica, the following results were obtained:

Between	2.50	and	3.00	per cent of extract in		3	samples.
"	2.00	"	2.50	"	"	5	"
"	1.50	"	2.00	"	"	1	"
"	1.00	"	1.50	"	"	1	"
"	0.50	"	1.00	"	"	1	"

There were 15 samples of iodoform, 7 of chloroform, 3 of alcohol, and 11 of stronger ether, all of which proved to be of proper quality. The 2 samples of distilled water proved to be simple tap water. Of the 10 samples of simple syrup 6 proved to be markedly deficient in sugar, averaging in fact hardly half of the proper amount. Of 9 samples of compound spirits of ether, but 2 had in any approximate degree the proper proportions of the very important ingredient, heavy oil of wine. Of 14 samples of spirits of nitrous ether, but 7 at all approached the proper proportions of ethyl nitrite, while the other 7 had less than one-quarter of that amount. The 17 samples of chloral hydrate were all of standard quality. Of the distilled spirits, whiskey and brandy, 4 samples were examined, and all, as has happened in previous years, have proved not to be of the special quality called for under the drug law for use in medicine. They had all, in short, been "improved" or manufactured by the arts of the rectifier, while the law in this particular instance allows of no other "improvement" in the straight distilled spirit from fermented grain or grape than that effected by nature alone in time.

In this connection an article in a recent number of the AMERICAN DRUGGIST upon an exhaustive report lately made by Prof. W. Fresenius in his *Zeitschrift für analytisohe Chemie* upon the composition and constituents of distilled spirits, is of interest. It says: "It is quite certain that only a very minute proportion of the distilled spirits, as they appear in the market, actually correspond to the definition of 'pure distillates from their respective fermented mashes.'" "As the addition of a small proportion of cane sugar is universally conceded to result in an improvement of the taste of brandy, it cannot on its own

account be objected to. The question is only whether cognac thus 'improved' is still to be called or recognized as cognac or brandy, or whether it is to be classed among compound liquors (cordials, liqueurs), although commercial custom has up to the present retained the name of cognac for this 'compound' article. The German custom authorities, however, often fail to accept this view. In consequence thereof French exporters have adopted the plan of sending the pure 'unimproved' brandy by itself, and, separate from it, the requisite improving liquid (coloring matter, probably accompanied by certain aromatic essences)." He says further: "While the 'improvements' thus far outlined—addition of water, coloring matter, and sugar—are, to a certain extent, allowable, there is another manipulation which goes beyond this limit; this is the addition of spirit and the subsequent reduction with water, both of which are very commonly practised." With this addition of spirit begins a class, or series of changes, which form a gradual transition, indefinable as to the exact limits from the genuine to the adulterated brandy, and to its absolute imitation, in which latter there is not even a trace of the genuine distillate.

In proportion as the addition of spirit increases and the genuine distillate decreases, there is a diminution of the aroma, which is usually replaced by so-called cognac essences or other aromatic compounds; moreover, it becomes necessary to add more coloring matter and sugar. An interesting but not generally known fact has been communicated to Prof. Fresenius by Mr. Schmoelder, of Frankfort, namely, that the best cognac is not always obtained from the best vintages or "wine years," but that other ordinary and even inferior vintages may yield the best cognac. This is due to the fact that a less quantity of a strong wine is required to yield a given measure of brandy of a certain strength; thus the brandy obtained from a weaker wine may contain a greater concentration of the aromatic principles.

Prof. Fresenius further discusses at considerable length, taking the negative side, whether, as some authorities seem inclined to so regard it, a brandy which has been compounded or improved by the addition of aromatics and then redistilled, or has otherwise been manipulated, can still be justly regarded as a "distillation product from wine." He concludes that all other than that of the quality of the Pharmacopœia is to be considered as an artificial or manufactured brandy.

As to the quality of the cognac brandy when imported direct from France and sold, as the law directs, "as pure and unadulterated as when imported," the following extract from the December, 1888, report to the United States Department of State of O. Malmros, the United States Consul at Cognac, the commercial centre of the trade, may give some useful information. Cognac brandy, he says, is divided into two principal classes, "the champagnes," made from wine grown upon the plains cultivated from remote antiquity, and the "bois," grown on territory which until the present century mostly abounded in trees; this last is subdivided into "premiers," "fin," "bons," "ordinaire," and lastly "à terroir," which, on account of its strong, unpleasant taste, cannot be employed except in very small proportions for blending with other brandies, without injury to their flavor. The sandy, waste district producing this most inferior brand he says has suffered but little from the phylloxera, while in the remainder of the "bois" district its ravages have been formidable; but the vineyards of the "champagne" country have been entirely destroyed, and no champagne brandy has been distilled since the year 1878, when the phylloxera first made its appearance in the valley of the Charente River.

"Although the home consumption of cognac in France has not diminished at all during the past ten years, the production has hardly equalled the one-ninth of that of an average year before the phylloxera commenced, yet the exportations have declined only one-half. About 50 per cent of all the brandies exported to the United States are invoiced at 300 francs per hectoliter or under, while the average cost at which newly distilled pure brandy of standard strength may be imported into the United States, on the basis of 100 francs per barrel of wine of two hectoliters, M. Malmros states to be over 560 francs. From a comparison of these amounts one may, he thinks, infer the probable purity of the brandy imported. He has not, however, the slightest doubt that the great majority of the cognac merchants furnish as good and pure an article as the prices their customers are willing to pay enable them to furnish."

As whiskey was not among the distilled spirits examined by Prof. Fresenius, the following extract from a report by C. Richardson, a chemist of the United States Department of Agriculture, is instructive. His samples of "straight whiskey" were obtained directly from the United States bonded warehouse, through the United States Commissioner of Internal Revenue; his commercial samples were from reputable wholesale and retail dealers. He says: "Very few straight whiskeys are sold as such in America, it having been found desirable from a commercial point of view to mix the products of different fermentations or mashes which have a different flavor, to add artificial flavoring materials, such as tea, spices, and sugar, and often to reduce the strength with water." His results show that upon the average the commercial samples contained over twenty times as much total solids as did the natural ones. Herein his results agree with my own, as shown in previous reports.

Of wines five samples were examined, and among them three were found not to be the natural article called for by the standard of the drug law, but they had, like the samples of distilled spirits, been "improved."

In Spain, according to the royal decree of January 30th, 1888, concerning wines, based upon the report of the Royal Academy of Medicines and the Royal Council of Health, all wines are to be considered as adulterated which contain imperfectly rectified industrial alcohol, or impure alcohol from the residue or mash of grapes, which contain salicylic acid or other antiseptic substance, which contain any vegetable coal tar or other foreign coloring matter, which contain any glucose or starch sugar, or new wine, or any foreign glycerin.

The true sherry district is a territory of only about a dozen miles square, and is included within the towns of Port St. Mary's and Jerez, the chamber of commerce of which rules that all wines containing anything foreign to the pure must of the grape are to be deemed adulterated. The United States Consul at Cadiz, in his report to the State Department concerning the quality of wine shipped from that port, says of New York that "the largest quantity consumed there is of very low grade." And, "in general, the low-priced sherries are blended or compounded of four or more different sorts, viz.: alcohol; sweet wine, in which the fermentation has been checked by a large addition of alcohol; colored wine, cheap new wines of different kinds, and sometimes of a few gallons of older wine to help the whole to an older appearance."

Of 17 samples of pharmacopœial salts of bismuth and 7 of magnesia, 1 cream of tartar, 1 cocoa butter, and 27 U. S. P. acids, all proved to be of standard quality, as did also 24 different spices, 6 starches, 2 rhubarbs, and 10 lycopodiums.

One sample of olive oil proved to be mostly cottonseed oil, and one of musk proved to contain very little of that substance. Out of 13 samples of the pharmacopœial essential oils, all but 1 proved to be of fairly good quality, while out of 33 samples of the solid extracts 9 were not of standard quality.

Of honey 11 samples, of glycerin 14, and of lemon juice 1, were all good, while of pepsin 2 samples had only 1 of proper quality. Of proprietary articles, the following were examined: a hair dye which was found free from any injurious substance, while Radam's Microbe Killer appears to be principally a watery solution of burning sulphur fumes which had become decomposed into quite a strong solution of sulphuric acid. It seems to be flavored and partially disguised by the addition of some little sweet red wine. Its claim for originality and as a panacea for all ills would therefore seem to have only about the usual basis for such pretensions. Ozonos as a fairly strong solution of a permanganate has much more efficacy than originality as a disinfectant. The like could well be said of Modene, which was found to be one of the well-known sulphides which has been used for centuries for the removal of superfluous hair from the skin.

Valuation of Oil of Cloves.

H. THOMS recently read a paper on this subject before the Society of German Naturalists and Physicians, from which we take the following portions:

It may be safely assumed that *eugenol* is the principal valuable constituent of oil of cloves. This is at least the case so far as the therapeutic properties of the oil are concerned, for it is the eugenol which has been found quite efficacious (in form of benzoyl-eugenol) as a remedy in tuberculous affections. So far as the aroma of the oil is concerned, there is, indeed, another constituent which has a share in it, namely, the sesquiterpene which accompanies the eugenol.

Up to the present the methods for separating eugenol were so circumstantial that they could not well be used for a quantitative estimation. Thoms has succeeded in finding a new method which is very simple and easy, namely, by converting the eugenol directly into benzoyl-eugenol, for which purpose it is not even necessary to extract it first from the oil.

This compound, benzoyl-eugenol (or benzoate of eugenol), when pure, is a colorless and odorless solid ester (compound ether), in form of neutral crystals, of a faintly bitter taste, insoluble in water, easily soluble in hot, difficultly in cold alcohol, also soluble in chloroform, ether, and acetone. It is prepared by mixing eugenol with solution of soda or potassa, whereby the hydrogen of the hydroxyl group in the eugenol is replaced by the alkali metal. If now an equivalent quantity of benzoyl-chloride is added and the whole shaken, the formation of benzoyl-eugenol takes place quite rapidly, with evolution of heat. Upon cooling, the oil which has separated congeals, and can be obtained in colorless crystals by recrystallization from alcohol.

In order to show that the resulting product may be taken as a safe basis for the quantitative estimation of eugenol, the author quotes the following example, which at the same time shows the details of the process with quantities of ingredients:

Five grammes of eugenol, contained in a beaker holding about 150 C.c., are mixed with 20 Gm. of solution of soda containing 15 per cent NaOH, and then 6 Gm. of benzoyl-chloride are added. Both of the latter substances are used in excess, which is advisable. The whole is well agitated, which causes the mixture to become quite hot. After a few minutes the reaction is completed. When the mixture is cold 50 C.c. of water are added, a gentle heat then applied until the solidified ester has again separated in form of an oil, and the whole then allowed to cool again. The supernatant clear liquid is now filtered off, 50 C.c. of water are again added to the crystalline cake, heat applied until this fuses, the mixture cooled, the liquid filtered off, and the washing repeated once more. This washing removes the excess of soda as well as the sodium salt.

Any crystals adhering to the filter are returned to the beaker, the latter with contents dried at 101° C. and weighed.

Every 5 Gm. of eugenol [$C_6H_3.C_3H_5.OCH_3.OH=164$] correspond to 8.171 Gm. of benzoyl-eugenol [$C_6H_3.C_3H_5.OCH_3.O.OC.C_6H_5=268$]. The amount of the latter obtained by Thoms was 8.11 Gm., or 99.25 per cent of the theoretical yield.

On applying this process directly to oil of cloves, provision must be made to get rid of the sesquiterpene. This is done in the following manner:

After a portion of 5 Gm. of oil of cloves has been treated exactly in the manner just described for pure eugenol, the crystalline cake finally obtained is dissolved in a definite amount of warm alcohol of known strength, the solution allowed to crystallize, and the mother liquid separated by filtration at a definite temperature. The residue on the filter is dried at 101° C., and to it is added the weight of benzoyl-eugenol remaining in solution in the mother liquid.

This process is given by the author somewhat more in detail as follows:

Place the crystalline cake of benzoyl-eugenol finally obtained, while still moist, into a beaker, add at once 25 C.c. of alcohol of 90 per cent, warm it on a water bath, rotating it until solution has taken place, then remove the beaker from the water bath and continue rotating until the benzoyl-eugenol has separated in form of fine crystals, which requires only a few minutes. Now cool to 17° C., transfer the crystalline mass to a filter of 9 Cm. in diameter, and receive the filtrate in a graduated cylinder. About 20 C.c. will pass through. Enough alcohol of 90 per cent is then poured upon the contents of the filter to make the whole filtrate measure 25 C.c. The moist filter with contents is then transferred to a weighing bottle (in which the filter had previously been weighed at 101° C.) and the whole dried at 101° C. to a constant weight.

Twenty-five cubic centimeters of alcohol of 90 per cent dissolve, at 17° C., 0.55 Gm. of pure benzoyl-eugenol. This amount, therefore, must be added to the weight of the dried residue.

On examining a number of different specimens of oil of cloves by this method, the author obtained percentages of eugenol varying between 76.8 and 90.64, the average being about 80 per cent. It was also noticed that a higher percentage of eugenol was accompanied by a rise in specific gravity.—After *Berichte d. pharm. Ges.*, 1891, 278.

FIG. 1.

FIG. 2.

Windisch-Herzfeld Apparatus for Estimation of Fusel Oil.

ESTIMATION OF FUSEL OIL IN ALCOHOL.

AMONG all the methods so far known to estimate the amount of fusel oil in alcohol, that by means of chloroform, devised by Roese, is the most practicable and reliable. Roese found that alcohol containing even traces of fusel oil increased the volume of a given amount of chloroform much more than the same amount of alcohol minus the fusel oil.

Various kinds of apparatus have been proposed to apply this test so that the results may be found by mere inspection of a scale of marks. The latest and probably best instrument devised for this purpose is that of Herzfeld, modified by Windisch.

It consists of a pear-shaped glass-stoppered bulb with graduated tube attached (Fig. 1), the whole being about 40 Cm. (15¾ inches) long and holding about 200 C.c.

The glass stopper of the globe is ground as accurately as possible. The inferior portion of the tube is somewhat expanded, and not graduated. Its capacity is about 20

Cm. The graduated portion has a capacity for about 2.5 C.c. of liquid, and is 18 Cm. (7⅛ inches) long. Every cubic centimeter of liquid, therefore, occupies a length of 7.2 Cm. (about 2 13/16 inches), and these are divided into 50 equal parts. Each division, hence, corresponds to 0.02 C.c. Other instruments are also made (by Geissler in Bonn) in which the space occupied by 1 Cm. is divided into 100 parts.

The alcohol, for which the apparatus is graduated, should have or be reduced to a percentage of 30 by volume, or to a specific gravity of 0.9656 at 15° C.

Alcohol of other specific gravity must be reduced to 30 per cent exactly, at 15° C.

The estimation of the fusel oil is then conducted as follows:

By means of a long-stemmed funnel (Fig. 2), a little more than 20 C.c. of the purest chloroform, at a temperature of 15° C., is introduced into the expanded (and perfectly clean and dry) lower portion of the apparatus shown in Fig. 1, care being taken that no chloroform comes in contact with the interior of the graduated tube. The apparatus is then introduced into a bath or chamber, where it is brought to exactly 15° C., and, by means of a little blotting paper contained in a glass tube, enough of the chloroform is withdrawn to make it measure exactly 20 C.c.

Next, 100 C.c. of the alcohol to be examined, previously reduced to 30 per cent, and at a temperature of 15° C., is introduced, and also 1 C.c. of sulphuric acid of a specific gravity of 1.2857. The latter is added to cause a more rapid separation of the chloroform, and to prevent the formation of a layer of bubbles at the point of junction of the chloroform and the dilute alcohol. The apparatus is left for ten minutes in the chamber to acquire the standard temperature, then carefully stoppered, and inverted so that the whole of the liquid contents may pass into the pear-shaped bulb.

Holding the apparatus in a cloth wet with water at 15° C., and keeping the finger on the stopper, it is shaken energetically during one minute, or, according to Sell, one hundred and fifty times.

Next the apparatus is restored to its normal position, and by rotating around its longitudinal axis and gently tapping, all the chloroform drops adhering to the interior of the pear-shaped globe are made to descend to the bottom of the tube. [If the apparatus is kept lying on its side, the stopper being kept perfectly tight, until the separation has practically been completed in the globe itself, and the latter is then gradually inclined so that the chloroformic layer will descend into the stem, there will be less difficulty in obtaining two clear layers.—Ed. Am. Drugg.]

The apparatus is then left for fifteen minutes in the chamber at 15° C., and the volume of chloroform then read off.

At the same time, while the above process is practised, another experiment is conducted, in precisely the same manner, but with alcohol known to be free from fusel oil. This is not absolutely necessary, but is advisable as a means of eliminating any error which may be caused by slight changes of temperature.

The fusel oil found in the alcohol, though probably present in shape of various amylic ethers, is always reported (according to the proposition made by Stutzer) as "amylic alcohol."

The table in the next column, by Sell, shows how much "amylic alcohol" is contained in 30 volumes of the alcohol tested. By multiplying this with 33.33, we obtain the quantity present in 1 liter of the anhydrous alcohol contained in the particular specimen tested.

If an alcohol to be examined contains less than 30 per cent by volume, it must be brought to this strength by the addition of a sufficient quantity of absolute alcohol strictly free from fusel oil.

After the apparatus has been used it must be washed out, first with water, then with alcohol, and finally with ether. It is then warmed so as to expel the vapor of ether.

[*Note by Ed. Am. Drugg.*—If the apparatus were provided at its bottom with a glass stopcock—a perfectly ground Geissler stopcock would answer—it could be much more easily emptied and cleaned.]

Increase of volume of chloroform.	Volume of fusel oil. Per cent.	Increase of volume of chloroform.	Volume of fusel oil. Per cent.
....	.....	0.33	0.2188
0.01	0.0066	0.34	0.2255
0.02	0.0133	0.35	0.2321
0.03	0.0199	0.36	0.2387
0.04	0.0265	0.37	0.24535
0.05	0.0332	0.38	0.2520
0.06	0.0398	0.39	0.25861
0.07	0.0464	0.40	0.26524
0.08	0.05305	0.41	0.2719
0.09	0.0597	0.42	0.2785
0.10	0.0663	0.43	0.2851
0.11	0.07294	0.44	0.2918
0.12	0.0796	0.45	0.2984
0.13	0.0862	0.46	0.3050
0.14	0.0928	0.47	0.3117
0.15	0.0995	0.48	0.3183
0.16	0.1061	0.49	0.3249
0.17	0.1127	0.50	0.3316
0.18	0.1194	0.51	0.3382
0.19	0.1260	0.52	0.3448
0.20	0.1326	0.53	0.35144
0.21	0.1393	0.54	0.3581
0.22	0.1459	0.55	0.3617
0.23	0.1525	0.56	0.37134
0.24	0.15914	0.57	0.3780
0.25	0.1658	0.58	0.3846
0.26	0.1724	0.59	0.3912
0.27	0.17904	0.60	0.3979
0.28	0.1857	0.61	0.4045
0.29	0.1923	0.62	0.4111
0.30	0.1989	0.63	0.4178
0.31	0.20554	0.64	0.4244
0.32	0.2122	0.65	0.4310

After having been used three or four times the apparatus should be partly filled with nitric acid containing nitrous, and afterwards washed and cleaned as above directed.

The presence of various substances in the alcohol to be tested—for instance, essential oils, free fatty acids, etc.—materially affects the rate of expansion of the chloroform solution. This interference may, however, in most cases be avoided if (according to Stutzer and Reitmair) the alcohol is first distilled with caustic potassa. This causes the saponification of fatty acids, ethers, and certain essential oils, and the polymerization of aldehydes, and whatever foreign product then passes over into the alcohol is much less soluble in chloroform.

If such an alcoholic liquid is to be distilled, exactly 200 C.c. of it are measured off at 15° C. into a flask or retort, a few cubic centimeters of an alcoholic solution of potassa and some pieces of pumice are added, and distillation carried on to dryness. The distillate is collected in a graduated receiver and diluted with water to the previous volume—200 C.c. at 15° C. The alcoholic percentage of this is then determined, and a portion of it then brought to exactly 30 per cent, as above directed.—A. Sclavo, in *Rivista di Merciologia* (Milano), 1891, 118.

The Virchow Medal.—It is said that the medal presented to Prof. Virchow, at his recent jubilee, measures 118 Mm. in diameter, and is made from 18-carat gold. The front of the medal bears a bust representation of Virchow in relief. The back is adorned with an heraldic design, the allegorical figures of medicine and pathology, microscopes, books, skulls, and an Egyptian mummy.

Women Apothecaries in Russia.—The Russian Ministry of Education has recently sent a circular to all educational and medical commissions of the empire, informing them that every woman who has finished a course of a higher education may be engaged as a pharmaceutical apprentice in a drug store, and, by successive professional examinations, may attain the degree of "provisor," and become a pharmacist with the same rights and privileges as a man.

Detection of Nitrates and Chlorates.

MATTHEW FORBES communicates two new tests, one for nitrates in presence of chlorates, and one for nitrates in absence of chlorates, to the *Chem. News:*

1. *Nitrates in presence of Chlorates.*

Put together into a test tube—

Nitric acid,
Potassium chlorate,
Dilute sulphuric acid, and
Excess of copper foil.

Place the test tube in a beaker holding saturated solution of sodium chloride, and heat to boiling. The chlorate, being least stable, is first decomposed, the liberated chlorine attacking the copper and a greenish gas given off. At a higher temperature potassium nitrate is decomposed and attacks the copper, with formation of *brown fumes.*

2. *Nitrates in absence of Chlorates.*

Put into a test tube

Potassium nitrate,
Lead foil (shavings),
Hydrochloric acid, strong,

and heat. The potassium nitrate is decomposed and attacks the lead foil, with formation of lead nitrate, which is again decomposed by the hydrochloric acid, with formation of lead chloride, and this will be found as a white precipitate on cooling.

One advantage of this test lies in the fact that a nitrate can be detected in the presence of an iodide or bromide, because it is not dependent upon the formation of *brown fumes*, but upon a white precipitate of lead chloride. If a bromide or iodide is present, there will be free bromine or iodine, respectively, in addition to the lead chloride.

Alkaloidal Assay of Narcotic Plants.

DR. O. SCHWEISSINGER has had occasion to investigate the alkaloidal yield of narcotic plants cultivated near Berlin. He reports on his results in the *Pharm. Centralhalle* (No. 41). The method of assay which he used was the following:

Ten grammes of the finely cut dry herb (aconite, belladonna, etc.) are put into a flask, digested (warm) over night with 200 C.c. of water containing 1 C.c. of diluted sulphuric acid, the mixture being occasionally agitated. Flask and contents having been weighed as soon as the latter had been introduced, any loss of weight which the apparatus has suffered during standing is made good by adding enough water to restore the original weight. The mixture is then allowed to cool, strained, the residue pressed, and the strained liquid measured. It will measure, say, 180 C.c. (which would correspond to 9 Gm. of herb). [The author evidently pays no attention to any possible increase of volume due to the solution of extractive matter in the liquid.—ED. AM. DRUGG.] The above-mentioned amount is now evaporated on the water bath under constant stirring, during which time the temperature is conveniently kept at 65° C. (149° F.). When the residue weighs about 20 Gm. the thin-fluid extract is poured into a measuring cylinder or flask of the capacity of 100 C.c., and alcohol then added up to the mark (100), which causes precipitation. The whole is then thoroughly shaken. (Without this precipitation by alcohol the subsequent treatment with chloroform or ether-chloroform, by shaking with these menstrua, becomes impossible, owing to the formation of emulsions.)

The evaporation may also be continued down to about 10 C.c., and alcohol then added to 50 C.c. In this case, however, the sediment settles much slower and filtration is more difficult.

After the sediment has been deposited the liquid is filtered. A measured portion of the filtrate is evaporated to 10 C c., transferred to a separatory funnel, 1 C.c. of ammonia water added, and shaken with 40 C.c. of ether-chloroform (15 C.c. of chloroform + 25 C.c. of ether). Twenty cubic centimeters of the ether-chloroform solution are then removed, evaporated in a capsule, and titrated with one-hundredth normal acid.

This method had been published by the author before, but since it has given him so uniform and accurate results, he has now republished it.

The results obtained by the author are interesting also to us, since they show the average yield of alkaloid under several conditions.

	Amount of alkaloid in the air dry herb.	Amount of alkaloid in the anhydrous herb.	Amount of water in the herb.
Aconite herb, 1 year old, cultiv.....	0.360	0.417	13.55
" " wild (1890).....	0.496	0.585	15 2
" " cultiv. (1890).	0.496	0.602	17.74
Belladonna leaves, 1 year old, cultiv.	0.189	0.209	12.5
" " wild (1890).....	0.309	0.402	23.25
" " cultiv. (1890).....	0.132	0.172	23.5
Hyoscyamus " wild (1890).....	0 072	0.085	15.4
" " cultiv. (1890).....	0.063	0.070	9.85
Stramonium " wild (1890).....	0.289	0.319	9.6
" " cultiv. (1890).....	0.231	0.255	9.5

The Separation of Resin from Fatty Acids.

THE detection of resin and its separation from fats and oils was at one time a very difficult problem to the analyst, and in many cases was impossible. Amongst many processes we have those of Henderson, Barford, and Gladding, the latter of which has found the greatest favor. It suffers from one very serious defect, however, and that is the correction for solubility of the fatty acids and silver salts in ether. This is a very variable factor, and, of course, is dependent on the nature of the fatty matter used in the fabrication of the soap. With small quantities of resin the error thus introduced may be as much as 20 to 30 per cent, but, of course, in soaps of high resin content—say 20 per cent—the error diminishes.

Mr. R. Williams (*Analyst*, vol. xv., p. 169) obtained very good results by the process; thus, in a soap which actually contained 30.0 per cent of resin he obtained 30.7 per cent, but no mention is made as to whether the amount remaining in the lyes, after precipitation of the soap, was determined. As to the simple detection of the resin, no doubt the best test is to boil the dry fat or fatty acids (10 drops) with 5 C.c. of acetic anhydride, cool, and add 2 drops of pure sulphuric acid (1.84 specific gravity), when the reddish-violet color due to resin is easily observed, 1 per cent of which can thus be detected.

It seems that all the above processes must make way for the admirable process of Twitchell (*Analyst*, October, 1891), who found that whereas fatty acids are, as is well known, converted into neutral ethers on passing dry hydrochloric acid gas into their alcoholic solution, the acids constituting resin are not attacked. The process obviously may be either gravimetric or volumetric, but chemists will prefer the latter on account both of speed and accuracy. The description of the process is as follows: 2.5 to 3 Gm. of the dried fatty and resin acids are dissolved in from 25 to 30 C.c. of perfectly absolute alcohol, and a current of dry hydrochloric acid gas passed in constantly. The flask containing the mixture must be kept cool by immersion in cold water. When the etherification is complete, the ethers separate and the gas is no longer absorbed. The flask is removed, corked well, and allowed to stand half an hour. The contents are diluted with about 100 to 125 C.c. of hot water, then cooled, transferred to a separatory funnel, and agitated with 75 C.c. of ether. The watery layer is removed and the ethereal layer washed with cold water till neutral to delicate litmus solution (twice always is sufficient). The ethereal liquid is received in a flask, the separator washed out with about 50 C.c. of neutral spirit, and the whole titrated by standard alcoholic alkali, using phenolphthalein as indicator. The alkali should be standardized by an accurate solution of half-normal HCl, and should be either one-fifth or one-half normal, according to the amount of the resin in the fatty acids. Taking the mean combining weight of resin at 347, then the percentage is easily calculated; it is reported both on 100 of dry fatty matter and on 100 of soap.

Twitchell's test experiments are eminently satisfactory, and I have now pleasure in confirming them by my own tests:

1. Sample of distilled fatty acids containing *no resin*, when treated as described, showed 0.7 per cent of resin.

2. The above distilled fatty acids, to which was added common resin to the extent of 22.5 per cent, showed, when treated as above described, 23.3 per cent of resin, which, after deducting the 0.7 per cent found in No. 1, gives exactly 22.5 per cent, or the amount which was added.

3. Soap made from palm oil and other fats, but no resin, gave 0.8 per cent resin.

4. Another soap, made from fatty matter of unknown origin, but no resin, gave 1.0 per cent resin. This, it should be observed, was of a dark color, and evidently contained some altered or oxidized oily matter.

5. Soap which showed by Gladding's test 6 per cent of resin, gave 4.9 per cent by Twitchell's process.

The above results are all that may be desired, and I have now to show how the process may be still further shortened without any sacrifice of accuracy. This can be done by leaving out the washing, and dissolving in alcohol direct. A few drops of methyl orange are then added, and alkali till neutral to this indicator; phenolphthalein is then added, and the titration completed as before. The alkali required in the first case is for the neutralization of the free hydrochloric acid, and is of course neglected. That required to neutralize with phenolphthalein as indicator is of course due to resin, and is calculated as such.—J. ARTHUR WILSON in *Chem. News*, October 23d.

A New Indicator for Estimating Minute Amounts of Alkali.

F. MYLIUS and F. FÖRSTER base their method on the extreme delicacy of iod-eosin (erythro-eosin) as an indicator, when used in an entirely novel manner. The commercial preparations of erythro-eosin require purification before they can be applied to this purpose, since they contain small quantities of impurities (almost insoluble in ether), which communicate a blue-violet tint to alkaline solutions. For purification the commercial dye is dissolved in ether saturated with water, filtered, and the filtrate shaken up with dilute solution of caustic soda. The erythro-eosin passes into the ether, and from this it is precipitated as a brick-red sodium salt by the further addition of caustic soda solution. The precipitate is filtered off, washed with spirit, and crystallized from hot alcohol, the impurities remaining behind in the mother liquor. For titration, $\frac{N}{1000}$ solutions are used, which must be made with *pure, neutralized water*. Water kept in vessels of inferior glass soon shows signs of impurity; $\frac{N}{1000}$ solutions, however, if kept in vessels of good glass, are stable for some time. The titration is performed in a stoppered flask: 50 to 100 C.c. of the aqueous fluid to be investigated are shaken with 10 to 20 C.c. of ether containing in solution not more than 2 Mgm. of the purified erythro-eosin per liter. Such a solution is almost colorless; but if free alkali be present, the aqueous layer, after shaking, appears of a rose-red color. Upon neutralization it again becomes colorless. The titration is best ended by adding alkali until a faint rose color is produced, 0.2 C.c. being deducted from the total quantity of alkali used. The influence of carbon dioxide on the result is practically *nil*, hence the carbonates in water may be easily and conveniently estimated by this process, the amount of acid used being the measure of the combined carbon dioxide. In like manner can be demonstrated the solubility of calcium carbonate in water; the decomposition which ensues on heating solutions of ammonium salts shown, the absolute neutrality of salts secured, etc. Examples are given showing that salts, even when obtained from first-class houses, are seldom absolutely neutral. The neutrality of zinc salts, otherwise so difficult, is easily ascertained by this process. The oxides of magnesium, cadmium, manganese, nickel, and cobalt behave like zinc oxide; those of iron, aluminium, and chromium act as free acids. Since silver and platinum form insoluble compounds with the indicator, the testing of the salts of these metals is rendered difficult. The method is useless for the estimation of vegetable acids. For ascertaining smaller quantities than the equivalent of 0.1 Mgm. of sodium hydroxide, the authors propose a colorimetric modification of their process. This is, however, much too elaborate and complicated for ordinary practical work.—After *Berichte d. chem. Ges.*, 1891, 1482.

Pharmaceutical Arithmetic.

THE following simple rule is given by A. Frankenstein, in the *Pharm. Zeitung*, for preparing a liquid of a specified density by mixing two liquids, one of higher, the other of lower specific gravity.

The underlying principle is, of course, the same as that on which other methods are based. But the form of statement is different.

The principle is, that the volumes of the two liquids to be mixed are to each other *inversely* as the respective differences of their specific gravities from that to be produced.

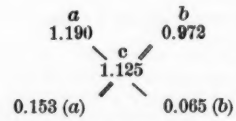
Supposing two liquids are given:

a—having the spec. grav. 1.190
b— " " " " 0.972

and there is to be prepared

c—having the spec. grav. 1.125

We write:



These two numbers denote *volume*. The two liquids, therefore, must be mixed in the proportion of

0.153 or 153 volumes (liters, etc.) of *a*

and

0.065 or 65 " " " of *b*.

Of course, it is assumed that there is no contraction when the liquids are mixed.

Since the weight of the respective volumes may be found by multiplying each volume by its corresponding specific gravity, we obtain:

0.182 parts by weight (182 kilos, etc.) of *a*
0.0632 " " (63.2 " " of *b*,

or

100 Gm. of *a*

and

34.7 " " *b*.

If there is an alteration of volume—as for instance, when alcohol and water, or very strong and very weak alcohol, are mixed—then it is preferable to substitute percentage by weight for the specific gravity in the first given formula. The differences between these and the percentage sought will then at once give the quantity, by weight, of the two liquids required. For instance,

a—alcohol of spec. grav. 0.830
b—alcohol of spec. grav. 0.940

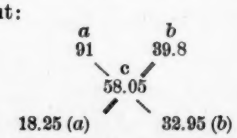
are to be mixed so as to produce

c—alcohol of spec. grav. 0.900.

By consulting the tables of the Pharmacopœia, we find the following equivalents for alcohol of the above-mentioned specific gravities:

a (0.830) 91%; *b* (0.940) 39.8%; *c* (0.900) 58.05%.

We therefore put:



That is, we mix 18.25 parts by weight of *a* with 32.95 parts by weight of *b*, and thus obtain a liquid containing 58.05 per cent by weight of alcohol, corresponding to the specific gravity 0.900.

Assay of Cinchona.

PROF. H. BECKURTS, of Braunschweig, has found that the most accurate and reliable method of valuation of cinchona barks is that which was some time ago proposed by W. Haubensack. As this method is at present being tested by various experts in this country, and ought to be more generally known, we publish it here (after *Pharm. Rundschau*).

Place 20 Gm. of cinchona, in *very* fine powder [No. 100], into a 500-C.c. flask, add [a mixture of] 10 C.c. of official ammonia water and 20 C.c. of official alcohol, shake thoroughly, and then add 170 C.c. of [stronger] ether. After two hours remove 100 C.c. of the clear liquid portion to a separatory funnel, add 50 C.c. of water and 2 C.c. of diluted sulphuric acid, and shake well. Draw off the acid, yellowish, aqueous liquid, add to it a few drops of solution of soda so as to liberate the alkaloids, and then shake the mixture with 30 C.c. of chloroform. Draw off the clear, chloroformic layer into a carefully tared, small flask, and again shake the aqueous layer with 20 C.c. of chloroform. Unite the chloroformic liquids, distil or evaporate off the chloroform, and dry the residue at 100° C. to a constant weight.

The quantity of alkaloids found multiplied with 10 represents their percentage in the cinchona examined.

Anacardic Acid as Hair Dye.

THE pigmentary properties of the viscous liquid secreted under the pericarp of the cashew nut (*Anacardium occidentale*) has long been known, and the liquid has been stated to yield a good indelible stamping ink. According to Gawalowski (*Zeit. Oest. Apoth.-Ver.*, September 10th, p. 485), the ammonium salt of anacardic acid ($C_{22}H_{32}O_{31}$), one of the constituents of the liquid, can be advantageously used as a means of darkening the hair. For this purpose the hair is first moistened with an aqueous solution of the salt and afterwards combed with a comb that has been dipped in a solution of ferrous sulphate; or the ammonium anacardate may be applied in a pomade or oil, and instead of the solution of ferrous sulphate an oleate of iron may be employed. It is stated that after a short exposure to the air the hair so treated assumes a more or less dark color, which is tolerably persistent, but nothing is said as to the exact tint. It is obvious that anarcardic acid used for this purpose must be quite free from the acrid cardol that accompanies it in the nut. Gawalowski directs that it should be prepared by treating the residue from the evaporation of an ethereal extract of the crushed pericarp with water as long as the washings showed traces of tannic acid, then dissolving it in 15 to 20 parts of alcohol, shaking the solution vigorously with freshly precipitated lead hydrate, filtering and washing the precipitate with alcohol, and decomposing the lead salt so obtained with freshly prepared sulphide of ammonium, and filtering. Upon strongly cooling the filtrate, which contains the ammonium salt of anacardic acid and excess of ammonium sulphide, and treating it with sulphuric acid, the acid separates at once as a soft mass, which, after being pressed between filter paper, is dissolved in ammonia and then remains soluble in water. According to Dymock (*Veg. Mat. Med. W. Ind.*, p. 199), a tar obtained in roasting the nuts, and largely used in India for tarring wood, contains about 90 per cent of anacardic acid and 10 per cent of cardol.—*Pharm. Journ.*

Preparation of Bromoform.

THE following rapid method for preparing bromoform is published by G. Denigès in the *Journ. de Pharm. et Chim.* (September, 1891, page 243):

Solution of Soda (spec. grav. 1.330)	100 C.c.
Distilled Water	200 "
Bromine	20 "
Acetone	a sufficient quantity.

Place the solution of soda and the water into a flask of the capacity of about 1 liter, surround it with cold water, and add to it the bromine. This will at once fall to the bottom and should be made to dissolve only gradually in the liquid, so as to avoid raising the temperature. When the bromine is all dissolved and the liquid of a uniform yellow color, gradually add acetone until the liquid becomes colorless. About 10 C.c. will be required. There will quickly be produced a lower layer of liquid, consisting of bromoform, almost entirely colorless.

The product is washed several times, then removed with a pipette. As it is very heavy, it is easy to separate it from water. By filtration it is obtained pure enough for almost any purpose.

To render it chemically pure it is rectified, and that portion collected as pure bromoform which comes over between 148° and 152° C. (298°–306° F.).

The reaction takes place in two steps as follows:

I. $6NaOH + 6Br = 3NaBrO + 3NaBr + 3H_2O$
(soda, bromine, sodium hypobromite, sodium bromite, water)

II. $3NaBrO + CO(CH_3)_2 = CHBr_3 + NaC_2H_3O_2 + NaOH$
(sodium hypobromite, acetone, bromoform, sodium acetate, soda)

Theoretically, 100 parts of bromine yield nearly 53 parts of bromoform. In reality, only about 35 parts will be obtained. But the rest of the bromine is not lost. It may be recovered as bromide, etc., from the mother waters.

Büchner's Wash-Bottle.

Rey's Burette Float.

A NEW WASH BOTTLE.

BÜCHNER recommends wash bottles, or rather wash pots, made of enamelled iron, to be used instead of those made of glass, as the latter are so apt to be broken. The form selected resembles that of Erlenmeyer's flasks. Prof. Dittmar also suggests to use wash flasks made of pure nickel, or of copper thoroughly silvered inside.

We presume that vessels coated like the well-known agate or granite ware would find a ready sale for this purpose.

A NEW BURETTE FLOAT.

ERDMANN'S float is useless for opaque or very dark-colored liquids, since the mark upon it cannot be seen under these circumstances. H. Rey has devised a float which is applicable in all cases, as the mark is upon a separate bulb which is never immersed. The float is weighted with just enough mercury to cause it to sink in the liquid up to the neck *a*, *b*.—After *Berichte*, 1891, 2098.

A New Burette without Stopcock.

C. ELSCHNER recommends to use for such liquids which are apt to corrode stopcocks or rubber tubing (closed by a pinchcock), the following arrangement:

A plain Mohr's burette, without stopcock, is drawn out, at its outflow end, to a fine point. Into its mouth is fitted a cork bearing a glass or rubber tube descending by the side of the burette, and provided with a stop- or pinchcock at about the same level at which it would have been in the burette tube itself. The burette is first filled by temporarily closing its orifice with a small piece of rubber tubing pinched together or closed by a glass rod. When the cork bearing the extra tube is inserted, the orifice of the burette is released, and its contents may then be drawn off in a flow or in single drops by regulating the stop- or pinchcock in the secondary tube.—*Chem. Zeit.*, No. 52.

American Druggist

AN ILLUSTRATED BI-WEEKLY JOURNAL.

VOL. XX., NO. 22. WHOLE NO. 220.

WILLIAM WOOD & COMPANY,

PUBLISHERS,

56 & 58 LA FAYETTE PLACE,

NEW YORK, N. Y.

SUBSCRIPTION PRICE per year, - - - - - - $1.50
SINGLE COPIES, - - - - - - - .10

Address all communications relating to the AMERICAN DRUGGIST *to* WILLIAM WOOD & Co., *56 and 58 La Fayette Place, New York City, to whose order all postal money orders and checks should be made payable.*

The AMERICAN DRUGGIST *is issued on the 1st and 15th of each month. Changes of advertisements should be received before the 5th and 20th. New advertisements can occasionally be inserted after the 10th and 25th.*

EDITORIAL.

A STUDY of the existing literature on heavy oil of wine, as well as of the various methods so far proposed for its preparation, published by Prof. Frederick B. Power, of Madison, Wis., in the *Pharm. Rundschau* (October), shows the opinion long held by many, viz., that the addition of the heavy oil of wine is, to say the least, unscientific and quasi-empirical, is correct. Not only do the best authorities on the subject disagree in their statements as to the composition and properties of the "heavy oil of wine," but it is even doubtful in some cases which of the so-called "oils of wine" some writer or author meant. It is safe to say that we know practically nothing about the real composition of the substance which the Pharmacopœia directs us to use in making "Hoffmann's Anodyne," and which some hypercritical authorities on therapeutics assert is the chief valuable ingredient. Singular to say, "Hoffmann's Anodyne" has for a century and more been extensively made *without* oil of wine, and used on the Continent of Europe, and all the existing medical literature of Continental writers up to the present time is based upon a simple mixture of alcohol and ether, otherwise known as *Spiritus æthereus* or *Spiritus ætheris*. We are aware that it was originally prepared in a different way, by a method which probably caused the distillate to contain variable quantities of the *Oleum vitriolis dulce*, but the literature of therapeutics contemporaneous with this method of preparation is no longer regarded as authoritative. The anodyne virtues of the mixture of ether and alcohol, *without* the oil of wine, have up to the present been recognized by all competent authorities, and there is probably no physician on the Continent of Europe who does not employ "Spiritus Ætherеus" (*without* oil of wine), freely, for precisely the same purposes for which the American or British physicians employ—or think they employ—the *Spiritus Ætheris Compositus* (*with* oil of wine). Yet prominent authorities here stand up as champions for the "heavy oil of wine." We will scarcely err if we assert that seven-eighths of all the Compound Spirit of Ether ever sold in this or the British market contained either only a small proportion of real "heavy oil of wine," or merely some so-called "light oil of wine," or consisted of a mixture of a by-product in the manufacture of ether (containing certain substances analogous to oil of wine) with alcohol. And nevertheless the universal verdict as to the efficiency of the preparation has not been undermined.

Since it is, with our present knowledge, impossible to isolate the oil of wine from the "Compound Spirit of Ether," and to apply to it any reliable tests of identity and purity, the recommendation made by Prof. Power, that it be dropped as unscientific, unless its nature, properties, and therapeutic effects are clearly established, and it is possible to test it for identity as well as purity, appears to be reasonable.

IN the recently completed new edition of his well-known "Manuale pharmaceuticum" (or "Promptuarium"), Hermann Hager has introduced a uniform nomenclature for alkaloids and for so-called neutral principles, the necessity of which appears to have suggested itself to him through an increased familiarity with the United States and British Pharmacopœias. Having observed that both of the latter had adopted the terminations *-ina* (English *-ine*) for alkaloids, and *-in* (English *-in*) for neutral principles, he also adopted these terminations, but just reversed their use. For alkaloids he chose the ending *-inum*, and for neutral principles *-ina*. We thus have: *chininum, pilocarpinum, morphinum*, etc., and *paraffina, glycerina, terpina, cantharidina*, etc. We regret that he did not see his way toward accepting the application of these terms among English-speaking nations, but we realize the difficulties which were in the way. The termination *-inum* has been that of the Latinized name of alkaloids ever since this class of substances became known, and such terms as *chininum sulphuricum, morphinum aceticum*, etc., etc., have become so thoroughly household words, not only among professional men but among the people at large, that a change in nomenclature appeared impracticable. This being once decided, so far as alkaloids were concerned, there remained nothing else but to select the termination *-ina* for the neutral principles.

In this country and in England the case is different. Ever since it was recognized that alkaloids partake of some of the properties of alkalies—such as soda, potassa, ammonia—it has been customary to make them end in *a* or *ia*, this termination being purposely chosen to express the analogy. Thus we had *morphia, quinia, strychnia, brucia*, etc., which are still in common use. For euphony's sake, in some cases, *-ina* was used—as, for instance, *narcotina, papaverina, picrotoxina*, etc.

When the last Committee on Revision revised the pharmacopœial nomenclature, it was deemed necessary to provide for some external sign of distinction between the two classes (alkaloids and neutral principles). And in doing this the committee availed itself of the fact that for some time previously the tendency of English-speaking chemists had been towards the termination *-ine* for alkaloids. Thus it had become customary to say *morphine, quinine, strychnine*, etc. Taking advantage of this fact, the committee simply turned these terms

into Latin by replacing the *e* through *a*, thus making the names feminines of the first declension. And in order to be consistent, the termination *-in* (Latin *-inum*) was applied to neutral principles. The new British Pharmacopœia also accepted these views and followed the example of the U. S. Pharmacopœia. It is not likely that the terms as at present accepted, here or in England, will soon be changed again. The discrepancy in nomenclature will, therefore, likely remain for a long time to come.

As announced by us a short time ago, the new improvements made by Raoul Pictet in methods of refrigeration are applied on a manufacturing scale for various purposes, among them for the purification of chloroform. Even the purest chloroform of the market was reported, when frozen by great cold, to leave behind a mother liquid containing various impurities which had hitherto escaped detection. A short time ago a number of chemical manufacturers of Germany agreed to put Pictet's chloroform upon their new lists, and in fact have done so. The cost of the new brand is, however, high, being four times that of chloroform responding to all the tests of the German Pharmacopœia, and over one-third higher than that made out of chloral, which had hitherto been regarded as the purest kind. A correspondent of the *Pharm. Centralhalle* (No. 35) very properly asks that the manufacturers (Raoul Pictet & Co., of Berlin, formerly of Geneva) throw some light upon the nature of the impurities which occur in chloroform, and which are removed by the freezing process. As these impurities were formerly unrecognized and unknown, and, if really existing, must have been encountered by the above-named manufacturers, working on the large scale, in tangible quantities, the profession has a right to inquire into their nature. We find this demand fully justified, and think that no credence deserves to be given to the superiority of the new chloroform until we know exactly what the impurities are which the latter has been deprived of.

We learn that even this new chloroform requires the addition of a small amount of alcohol, without which it does not keep well. Hence the theory that deterioration of chloroform unprotected by alcohol is due to minute quantities of impurities, is either wrong (if Pictet's chloroform is really a purified and pure article) or else its deterioration is not due to any impurities at all.

During a trial at Bremen of a dealer accused of having sold artificial "cognac" under this name, our present information regarding French cognac has been, if not materially increased, at least amply confirmed—viz., that there is scarcely any French cognac in the market that is derived purely from wine or grapes, and that there is none at all that has not gone through some process of dilution or improvement.

Up to the time when large French wine districts commenced to suffer from the devastations of the phylloxera, "cognac" was chiefly derived from grapes or wine exclusively. The cognac stills of Charente, however, always turned out a distillate containing so much alcohol—66 to 80 per cent—that it was, as such, unfit for consumption. It had to be diluted with low wines—up to that time likewise generally obtained from the same source as the strong distillate—and the product, thus brought to an alcohol percentage of about 55, was then allowed to season in the cask, and put on the market as "cognac." The destruction of thousands of hectares of vineyards, from about the year 1875, in various parts of France, revolutionized the cognac industry. Where any genuine distillate from wine is at all produced, it is no longer diluted with wine spirit, but with alcohol obtained from potatoes, beets, and other sources. The quality of the alcohol thus used is, however, unexceptionable. Most in demand is German alcohol, derived from potatoes.

The case against the Bremen dealer was decided as an infringement of the laws against adulteration, and the court ruled that "cognac" should be held to mean a "distillate from wine." This ruling is very well, so far as it goes; but we fear it does not go beyond the walls of the court-room, except on paper.

California brandies—not all, but a goodly number—at the present day come much nearer to what genuine cognac or brandy really is than the French product. The California brandies, however, possess a peculiar, fruity odor and taste which render them unpalatable to many persons. This flavor is supposed to be due to the "newness" of the soil on which grapes are cultivated, and is expected to become gradually less pronounced or modified.

The author of a paper recently presented at a pharmaceutical meeting mentioned as one of the advantages of his process for pharmaceutical assaying compared with another, that the necessary apparatus for the latter cost $3.92, while *his* required only an expenditure of $1.45; and by substituting a saucer costing $0.05 for an evaporating dish costing $0.35, the expense could be still further reduced to $1.15.

Has the practice of scientific pharmacy become so unremunerative that anybody can seriously offer such an argument in connection with such a subject? If it is so, why not *borrow* the saucer and save the miserable nickel? Indeed, if the prospective but impecunious analyst has the intelligence to warrant him undertaking an assay process at all, why may he not make his graduated cylinders out of broken lamp chimneys and bottles with the aid of borrowed standards, and thus eke out his miserable income?

But when information respecting chemical percentages is gleaned from such sources and by such means, we may admire the ingenuity of the experimenter, but prefer to rely upon results obtained with better apparatus.

In the domain of pharmaceutical assaying there would appear to be still sufficiently important matters to engage attention without asking pharmaceutical associations to consider whether one can save 30 cents of the cost of an evaporating dish by paying 5 cents for a saucer instead.

Detection of Traces of Copper in Distilled Water.—According to H. Thoms, distilled water often contains traces of copper which escape detection by the usual reagents, such as ammonia or potassium ferrocyanide.

Such traces may be detected by dissolving in the water some potassium iodide. The water will acquire a yellowish color if only 1 part of copper in 200,000 parts is present. Of course, the water must contain no other substance capable of decomposing the iodide or liberating iodine.—After *Pharm. Centralh.*

CORRESPONDENCE.

VOLUMETRIC ESTIMATION OF ACETATES.

Editors American Druggist.

GENTLEMEN: In your issue of October 15th I find a letter by Chas. Caspari, Jr., criticising my paper on the "Volumetric Estimation of Acetates," which was read before the Missouri Pharmaceutical Association and reprinted in the September 1st issue of the AMERICAN DRUGGIST.

The first column of the article deserves no reply, as it is merely an argument in favor of making our normal volumetric solutions on the basis of the hydrogen equivalent as against the molecular weight, and is evidently out of place in a letter correcting some errors which have crept into type. I clearly defined which was meant when I stated that "10 C.c. of the $\frac{N}{2}$ sulphuric acid should exactly neutralize 10 C.c. of volumetric solution of soda, U. S. Ph." The volumetric solution of this strength contains 49 Gm. H_2SO_4 per liter, and gives better results with methyl violet as an indicator than a weaker acid such as Dr. Caspari proposes. The turn of color is not so readily perceived as with other indicators (phenolphthalein, etc.), and it becomes necessary to lessen the error resulting from the tardy appearance of the blue color by using a strong volumetric solution and operating upon enough substance to bring the amount of acid well into cubic centimeters on the burette. Dr. Caspari's letter overlooks this when it lets 1 C.c. = 1 per cent in titrating Liquor ammonii acetatis. Here an error of $\frac{3}{10}$ C.c. would be one of $\frac{3}{10}$ per cent, while in my paper it would be an error of $\frac{1}{10}\frac{5}{0}$ per cent.

The errors in the original paper were made either by the printer or my assistant in copying the manuscript. In Liquor ammonii acetatis 1 C.c. should correspond to $\frac{5}{10}$ per cent instead of 2 per cent. The error in the acetate of iron preparations is as much a mystery to me as it doubtless was to Dr. Caspari. I append the same table with all corrections made:

Plumbi acetas	Weigh	9.46	Gm.	Each	C.c. acid	= 2	per cent of acetate.		
Liq plumbi subacetatis	"	13.7	"	"	"	= 1	"	"	"
Potassii acetas	"	4.9	"	"	"	= 2	"	"	"
Sodii "	"	3.4	"	"	"	= 4	"	"	"
Zinci "	"	5.92	"	"	"	= 2	"	"	"
Liquor ammonii acetatis	"	38.5	"	"	"	= 2/10	"	"	"
" ferri "	"	7.76	"	"	"	= 1	"	"	"
Tinct. " "	"	7.76	"	"	"	= 1	"	"	"

I take this opportunity to add a remark to my paper on "Elderberry Juice," which appeared in the AMERICAN DRUGGIST February 1st. At the time of writing the paper my experiments for using elderberry as an indicator in estimating phosphates were incomplete. I find it to turn at same number of cubic centimeters as rosolic acid or when the formula is Na_2HPO_4.

CLAUDE C. HAMILTON.

KANSAS CITY, Mo., October 30th, 1891.

NEWS AND NOTES.

MICHIGAN.

THE annual meeting of the State Pharmaceutical Association, held in Ann Arbor, passed off pleasantly and without incident. The report of the Examining Board showed a total of 3,628 registered pharmacists and 550 assistants now in the State. The number examined during the year was 400, of which 157 were given first-class certificates and 111 assistants' certificates. The Board made complaint against 76 persons for violation of the pharmacy law, and succeeded in convicting 15, 9 cases being still unsettled. This makes a total of 50 convictions since the law has been in force, the fines paid amounting to $620. The prevailing sentiment seemed to be that the pharmacy laws should be made more stringent and comprehensive. It is to be hoped this will be done, for the sooner the incompetent, the unscrupulous, and the ignorant are weeded out of the ranks of pharmacists the better it will be for the profession and the community at large. It is a noticeable fact, in connection with the high standard of pharmaceutical education demanded in Michigan, that this State suffers less than almost any other from the evils of cutting. If the standard is raised, may we not expect to see a still further elimination of this evil? Undoubtedly. Force out the unqualified and unprincipled, and the qualified pharmacist will be fully able to take care of himself. Allow them to remain, and the entire profession will become demoralized and poisoned by their influence.

MR. FRANK YOUNG, a popular pharmacist of Detroit, died November 1st at his residence. He had a store on the corner of Monroe and Antoine, and was very well known and liked in the eastern part of the city. Mr. Young was a prominent member of the Knights of St. John, who will attend his funeral in a body. He was a graduate of the Philadelphia College of Pharmacy, and was but 28 years old at the time of his death.

During the recent disastrous fire which swept over the village of Carsonville, the store of DR. SMITH was damaged to the amount of $500.

DR. J. F. KEABLES, of Decatur, who had been seriously ill for the past six months, died at his home November 1st.

The Michigan Pharmaceutical Association has elected as president H. G. Coleman, Kalamazoo; vice-presidents, Stanley E. Parkill, Owasso; L. Paule, St. Ignace; A. S. Parker, Detroit. Chas. Parsons and Wm. Dupont, of Detroit, are chosen secretary and treasurer.

The National Wholesale Druggists' Association, at its meeting in Louisville last month, elected as president William A. Robinson, Louisville; vice-presidents, John McKesson, New York, H. T. Clark, Lincoln, J. H. Rhodes, Chicago, Charles Hubbard, Buffalo, Henry B. Gilpin, Baltimore; secretary, A. B. Merriam, Minneapolis; treasurer, S. M. Strong, Cleveland; board of control, R. D. Noyes, St. Paul, Alex. H. Jones, Philadelphia, J. W. Rankin, Atlanta, Geo. R. Hopkins, St. Louis, J. A. Tilman, Boston.

The Association adopted the plan of the American Pharmaceutical Association for regulating the sale of proprietary remedies, and chose Montreal as the place for the next meeting.

BIBLIOGRAPHY.

TWENTY-SECOND ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF MASSACHUSETTS. Pp. 588, 8vo. Boston, 1891.

The subject of water supply is most elaborately treated, and numerous observations of the sources of supply throughout the State, with chemical and microscopical examinations of the water, are included. Quite as important may be considered the detailed advice given to various cities and towns upon the subject, as well as the general suggestions as to the selection of sources of supply. This chapter alone should render the report most valuable to those who contemplate a system for furnishing water to communities elsewhere.

The report of analysts upon foods and drugs is but slightly inferior in interest, and may be studied with profit. Surely the money expended by the Commonwealth upon the maintenance of its Board of Health is a profitable investment when it produces such manifest results.

An Extemporaneous Platinum Crucible.—When a platinum crucible ought to be employed for combustion, and none is at hand, a good substitute for it may be made, according to H. N. Warren (*Chem. News*), from a piece of platinum foil, which is folded twice like a plain filter. It can easily be cleaned and used over and over again as long as the folded edges remain unbroken.